embodiment, a substrate **262** is used to support thin film **260**. In a preferred embodiment, substrate **262** is about 0.03 mm thick. In another embodiment, substrate **262** is coupled to thin film **260**. In **FIG. 6A**, top ring **152** and bottom ring **154** have reversibly deformed diameter **24** as shown by arrows **24** and discussed previously in **FIG. 2C**. Inner ring **156** has non-deformed (memorized) inner diameter **250** as shown by arrows **250**.

[0087] **FIG. 6B** illustrates the configuration of sample holder **150** shown in **FIG. 6A** when a temperature change **264**, such as heat, is selectively applied to coupled top ring **152** and bottom ring **154**, such as with an electric current. Top and bottom rings **152, 154** expand to memorized outer diameter **270** as shown by movement arrows **272**. Thin film **260** and/or substrate **262** are strained outward shown by movement arrows **274**. Inner ring **156** is reversibly expanded to inner diameter **276** by the expansion of top and bottom rings **152, 154**. Sample holder **150** will remain in this expanded position after the change in temperature **264** ceases.

[0088] **FIG. 6C** illustrates the configuration of the expanded sample holder **150** shown in **FIG. 6B** when temperature change **264**, such as heat, is selectively applied to inner ring **156**, such as with electric current. Because inner ring **156** is a shape memory alloy that has been reversibly expanded to inner diameter **276** as shown previously in **FIG. 6B**, selective temperature change **264** will cause inner ring **156** to contract toward non-deformed (memorized) diameter **250**. This contraction, shown by movement arrows **280** causes top and bottom ring **152, 154** to contract towards their previous reversibly deformed outer diameter **24**. The strain on thin film **260** and/or substrate **262** is changed as shown by movement arrows **282**.

[0089] In a preferred mode, the expansion and contraction cycle on sample holder **150** shown in **FIG. 6A** through **FIG. 6C** is repeated to conduct biaxial fatigue analysis on thin film **260**. In another mode, sample holder **150** is used to conduct bi-directional straining experiments. In another embodiment, top and bottom rings **152, 154** are reversibly contracted and inner ring **156** is reversibly expanded before assembly.

[0090] In one embodiment, top and bottom rings **152, 154** are electrically isolated from inner ring **156**. In further contemplated embodiments (not shown), sample holder **150** is adapted to be an actuator instead of supporting thin film **262** and/or substrate **264**. In a still further embodiment, the assembly of top and bottom rings **152, 154** with inner ring **156** is adapted to be an adjustable radial brake. In another embodiment, the assembly of top and bottom rings **152, 154** with inner ring **156** is adapted to be an adjustable radial collar. In a further embodiment, the assembly of top and bottom rings **152, 154** with inner ring **156** is adapted to be a removable, temperature actuated radial clamp. In a still further embodiment, the assembly of top and bottom rings **152, 154** with inner ring **156** is adapted to tune resonate RF cavities.

[0091] In another embodiment (not shown) top and bottom rings **152, 154** are configured with non circular inner perimeters. In a further embodiment, inner ring **156** is configured in a non circular shape adapted to mate with top and bottom rings **152, 154**. A non circular configuration for sample holder **150**, such as an oval or a polygon, can produce asymmetrical biaxial strain on a thin film sample. A non circular configuration for an actuator can be adapted to produce asymmetrical biaxial and radial forces and movements.

[0092] **FIG. 7** illustrates another embodiment of the invention shown in **FIG. 5** through **FIG. 6C** as a cross section view through a ring system **300** consisting of a top ring **302**, a bottom ring **304**, and in inner ring **306** configured as the prime mover of an actuator. In one mode, ring system **300** is an actuator in a micro-electromechanical system (MEMS). An actuator member **308** is shown coupled to ring system **300** with male threads **310** that mate with female threads **312** between top and bottom ring **302, 304**. In one mode, actuator member **308** is coupled to the inside of ring system **300** as shown. In another mode of this embodiment (not shown), actuator member **308** is coupled to the outside of ring system **300**. In a further mode (not shown) a plurality of actuator members **308** are coupled to ring system **300**. In a still further mode, ring system **300** is non circular.

[0093] **FIG. 8** illustrates a further embodiment of the invention in a cross section view of a portion of ring assembly **320**. Ring assembly **320** has outer ring **322** with annular recess **324** and inner ring **326** adapted to fit in recess **324**. In one mode, outer ring **322** is reversibly expanded and inner ring **326** is reversibly contracted before assembly. Outer and inner ring **322, 326** can be coupled by threads as discussed previously in **FIG. 6A** through **FIG. 6C** or by other conventional means. Thin film **328** is secured between outer ring **322** and inner ring **326**. In another mode of this embodiment, thin film **328** is replaced by an actuator member coupled to ring assembly **320** in a manner similar to that discussed previously in **FIG. 7**. In a further mode of this embodiment, outer ring **332** is electrically isolated from inner ring **326**. In another mode, ring assembly **320** is configured as a reversible radial actuator in a MEMS. In a still further mode, ring assembly **320** is an oval, a polygon, or other non circular shape.

[0094] **FIG. 9** illustrates another embodiment of the invention in a cross section view of a portion of ring assembly **330**. Ring assembly **330** has top ring **332** and bottom ring **334**. In one mode, top ring **332** is reversibly expanded and bottom ring **334** is reversibly contracted before assembly. Top and bottom ring **332, 334** are coupled together by threads, adhesive, fasteners, mating pins or other conventional coupling means. In one mode, a plurality of actuator members (not shown) are coupled to ring assembly **330** in a manner similar to that previously described in **FIG. 7** and **FIG. 8**. In another mode, ring assembly **330** is a reversible radial collar, clamp or brake. In a further mode of this embodiment, top ring **332** is electrically isolated from bottom ring **334**. In another embodiment, ring assembly **330** is a reversible radial actuator in a MEMS. In a further embodiment, ring assembly **330** is non circular.

[0095] **FIG. 10** illustrates another embodiment of a sample holder designated **350**. Sample holder **350** has top ring **352** and bottom ring **354** adapted to align and couple. Top ring **352** and bottom ring **354** are coupled with adhesive, fasteners, mating pins, interlocking surfaces or other conventional means. Top ring **352** has distal surface **356**, proximal surface **358**, outer perimeter **360** and inner perimeter **362**. Radial position **364** on proximal surface **358** and